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EXAMINER	
CURS, NATHAN M	

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Please find below and/or attached an Office communication concerning this application or proceeding.

SM

Office Action Summary	Application No. 10/046,139	Applicant(s) WAY, WINSTON
	Examiner Nathan Curs	Art Unit 2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 09 January 2002.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-51 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-51 is/are rejected.

7)☒ Claim(s) 10, 11, 17 and 51 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 09 January 2002 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 8/18/03, 8/26/02
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: page 8, line 12 and page 9, line 22 are missing proper serial numbers.

In addition, several instances of "sub-wavelengths 16" occur throughout the specification. However, reference character 16 doesn't refer to sub-wavelengths in any of the figures.

Appropriate correction is required.

Claim Objections

2. The claims are objected to because of the following informalities: multiple instances of misspelling of the word "spacing".

Also, claims 10 and 11 are objected to because of the following informalities: "single optical transmitters" should be "single optical transmitter".

Also, claims 17 and 51 are not properly punctuated.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 36 and 45 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to

which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claims 36 and 45, the purpose, use, function or structure of the claimed plurality of receivers as wavelength-tunable is not disclosed or described in the specification.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 8 and 43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 8, the claim is an incomplete sentence and thus unclear.

Claim 43 recites the limitations "a second electronic multiplexer". There is insufficient antecedent basis for these limitations in the claim since there is no "first" electronic multiplexer claimed.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 5-9, 12-19, 28, 33-35 and 37-39 are rejected under 35 U.S.C. 102(e) as being anticipated by Swanson et al. ("Swanson") (US Patent No. 6433904).

Regarding claims 1 and 28, Swanson discloses a method of transmitting optical signals in an optical communication system, comprising: receiving an optical input that has a first data rate and first spectral efficiency (fig. 4, element 12b" and col. 9, lines 9-19); splitting the optical input into a plurality of subwavelengths, wherein the plurality of subwavelengths are spaced sufficiently close in wavelength to provide a spectral efficiency of all the subwavelengths of the plurality of subwavelengths that is close to or greater than a spectral efficiency of the optical input (col. 8, line 22 to col. 9, line 19); combining the plurality of subwavelengths (fig. 4, optical multiplexer element).

Regarding claim 5, Swanson discloses the method of claim 1, wherein the optical input is serial and the plurality of the transmitted subwavelengths are parallel (fig. 4 and col. 8, lines 48-65).

Regarding claim 6, Swanson discloses the method of claim 1, wherein the subwavelengths are generated by demultiplexing the optical input into the plurality of subwavelengths (col. 8, lines 48-65 and col. 9, lines 9-19).

Regarding claim 7, Swanson discloses the method of claim 6, wherein the subwavelengths are demultiplexed using all-optical demultiplexing (fig. 4, receive-side optical demultiplexer).

Regarding claim 8, Swanson discloses the method of claim 6, wherein the subwavelengths are demultiplexed by demultiplexing the optical input into a plurality of electronic signals that one or more optical transmitters (col. 8, lines 48-65 and col. 9, lines 9-19).

Regarding claim 9, Swanson discloses the method of claim 1, wherein a plurality of optical transmitters are provided to produce the plurality of subwavelengths, each of an optical transmitter including a wavelength locker (fig. 4 and col. 9, lines 9-19).

Regarding claim 12, Swanson discloses the method of claim 7, wherein the plurality of subwavelengths from a plurality of optical transmitters are combined by a multiplexer or an optical coupler (fig. 4, optical multiplexer element).

Regarding claim 13, Swanson discloses the method of claim 12, wherein a plurality of optical receivers are provided, each of an optical receiver of the plurality of optical receivers being configured to receive a subwavelength (fig. 4 and col. 8, lines 48-65).

Regarding claim 14, Swanson discloses the method of claim 13, wherein each of optical receiver includes one of an optical wavelength demultiplexer, an optical splitter, or an optical add-drop multiplexer that separates the plurality of subwavelengths (fig. 4, receive-side optical demultiplexer).

Regarding claim 15, Swanson discloses the method of claim 14, wherein the plurality of subwavelengths are introduced to multiple fixed optical to electrical converters (fig. 4, elements lambda.sub.2).

Regarding claim 16, Swanson discloses the method of claim 13, wherein a number of subwavelengths is equal to a number of optical receivers (fig. 4 and col. 8, lines 48-65 and col. 9, lines 9-19).

Regarding claim 17, Swanson discloses the method of claim 16, wherein a number of subwavelengths is in the range of 4 to 32 (fig. 4, "new" spectrum and col. 9, lines 9-19).

Regarding claim 18, Swanson discloses the method of claim 1, wherein the first data rate is 10 Gb/sec or more (col. 10, lines 12-23).

Regarding claim 19, Swanson discloses the method of claim 1, wherein a subwavelength data rate of each subwavelength 50 Gb/s or less, and spacing of the subwavelengths is 25 GHz or less (col. 9, lines 9-19).

Regarding claim 33, Swason discloses a long haul optical communication system, comprising: a first optical-to-electronic converter and a first electronic demultiplexer configured to receive and split an optical input into a plurality of subwavelengths, the optical input having a first data rate (fig. 4 and col. 8, line 22 to col. 9, line 19); a plurality of optical transmitters coupled to the first electronic demultiplexer, wherein the plurality of optical transmitters are configured to transmit the plurality of subwavelengths with a wavelength spacing sufficiently close to provide a spectral efficiency of all the subwavelengths of the plurality of subwavelengths close to or greater than a spectral efficiency of the optical input (fig. 4, elements 12b" and transmit-side elements lambda.sub.2 and col. 9, lines 9-19); a first optical multiplexer or first coupler (fig. 4, transmit-side optical multiplexer); a second optical demultiplexer, splitter or an OADM (fig. 4, receive-side optical demultiplexer); and a plurality of receivers coupled to the optical multiplexer or splitter and the first optical multiplexer or first coupler (fig. 4, receive-side elements lambda.sub.2).

Regarding claim 34, Swanson discloses the system of claim 33 further comprising: a second electronic multiplexer coupled to the plurality of receivers and configured to convert data rates of the plurality subwavelengths back to the first data rate (fig. 4, element MUX).

Regarding claim 35, Swanson discloses the system of claim 33, wherein the first data rate is 10 Gb/sec or more (col. 10, lines 12-23).

Regarding claim 37, Swanson discloses the system of claim 33, wherein the plurality of receivers is not wavelength-tunable (fig. 4, "new" spectrum and receive-side elements lambda.sub.2).

Regarding claim 38, Swanson discloses the system of claim 33, wherein a number of subwavelengths equals a number of receivers (fig. 4 and col. 8, lines 48-65 and col. 9, lines 9-19).

Regarding claim 39, Swanson discloses the system of claim 33, wherein a number of subwavelengths equals a number demultiplexed electronic signals (col. 9, lines 9-19).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 2-4, 20-27, 29-32 and 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swanson (US Patent No. 6433904).

Regarding claim 2, Swanson discloses the method of claim 1, wherein a total bandwidth occupied by the subwavelengths is within a same channel window of the optical input (col. 8, lines 51-54 and col. 9, lines 9-15), but does not explicitly disclose the channel window as an ITU window. However, given Swanson's disclosure of DWDM, the examples of 100 GHz channel spacing and 30 GHz channel bandwidth, and disclosing fitting the subwavelengths within the bandwidth of the original wavelength channel, it would have been obvious to one of ordinary skill in the art at the time of the

invention that the system of Swanson would conform to the well known ITU DWDM channel standard, since adhering to well known standards is conventional and enables a system design to be more widely accepted by customers.

Regarding claim 3, Swanson discloses the method of claim 2, wherein the total bandwidth occupied by the subwavelengths fits through filters set for the bandwidth occupied by the optical input (col. 9, lines 9-19). Swanson does not explicitly disclose that the total bandwidth occupied by the subwavelengths is less than the bandwidth occupied by the optical input; however, it would have been obvious to one of ordinary skill in the art at the time of the invention that the total bandwidth occupied by the subwavelengths would be less than the bandwidth occupied by the optical input, to provide the benefit of the combined subwavelengths fitting through existing filters used in the system with some margin.

Regarding claim 4, Swanson discloses the method of claim 2, wherein the total bandwidth occupied by the subwavelengths is 5 times or less than a bandwidth occupied by the optical input (col. 9, lines 9-19, where four subwavelengths fitting within the original channel bandwidth means the bandwidth occupied by the subwavelengths is less than five times the bandwidth of the channel bandwidth).

Regarding claims 20 and 29, Swanson discloses the method of claims 1 and 28, respectively, wherein a subwavelength data rate of each subwavelength is 10 Gb/s or less (col. 10, lines 12-23). Swanson discloses the example of four subwavelengths fitting within the original 30 GHz window (col. 9, lines 9-19), but does not explicitly disclose that the spacing of the subwavelengths is in the range of 5 to about 25 GHz. However, in the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art a prima facie case of obviousness exists (see MPEP section 2144.05).

Regarding claims 21 and 30, Swanson discloses the method of claims 1 and 28, respectively, wherein a subwavelength data rate of each subwavelength is 10 Gb/s or less (col. 10, lines 12-23). Swanson discloses the example of four subwavelengths fitting within the original 30 GHz window (col. 9, lines 9-19), but does not explicitly disclose that the spacing of the subwavelengths is in the range of 6 to about 25 GHz. However, in the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art a prima facie case of obviousness exists (see MPEP section 2144.05).

Regarding claims 22 and 31, Swanson discloses the method of claims 1 and 28, respectively, wherein a subwavelength data rate of each subwavelength is 2.5 Gb/s or less (col. 10, lines 12-23). Swanson discloses the example of four subwavelengths fitting within the original 30 GHz window (col. 9, lines 9-19), but does not explicitly disclose that the spacing of the subwavelengths is in the range of 3 to about 12.5 GHz. However, in the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art a prima facie case of obviousness exists (see MPEP section 2144.05).

Regarding claims 23, 24 and 26, Swanson discloses the method of claim 1, and discloses breaking up an aggregate rate signal into multiple lower rate signals via inverse multiplexing (col. 8, lines 22-28), occupying a single wavelength channel with a plurality of channels that collectively carry the information of an original signal (col. 8, lines 51-58), and discloses the example of four subwavelengths fitting within the original 30 GHz window (col. 9, lines 9-19), but does not disclose specific examples where the number of subwavelengths is 2, 8 or 16, and a subwavelength spacing is in the range of 20 to about 100 GHz, 5 to 25 GHz, or 3 to 12.5 GHz. However, the specification states the data rates that can be utilized include but are not limited to those listed in the table showing number of subwavelengths and corresponding subwavelength spacings (specification page 7, line 18 to page 8, line 1). This is not a disclosure of criticality for

the numbers of subwavelengths and subwavelength spacings versus other numbers of subwavelengths and subwavelength spacing. Absent any disclosure of criticality, the claimed limitations for number of subwavelengths and subwavelength spacing would have been a result of obvious engineering design choice.

Regarding claim 25, Swanson discloses the method of claim 1, wherein a number of subwavelengths is 4 (fig. 4 and col. 9, lines 9-19). Swanson discloses the example of four subwavelengths fitting within the original 30 GHz window, but does not explicitly disclose that the spacing of the subwavelengths is in the range of 6 to about 25 GHz. However, in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists (see MPEP section 2144.05).

Regarding claim 27, Swanson discloses the method of claim 1, wherein a number of subwavelengths is 4 (fig. 4 and col. 9, lines 9-19). Swanson discloses the example of four subwavelengths fitting within the original 30 GHz window, but does not explicitly disclose that the spacing of the subwavelengths is in the range of 3 to about 12.5 GHz. However, in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists (see MPEP section 2144.05).

Regarding claim 32, Swanson discloses a method of transmitting optical signals in an optical communication system, comprising: receiving an optical input that has a first data rate (fig. 4, element 12b" and col. 9, lines 9-19); splitting the optical input into a plurality of subwavelengths, wherein each of a subwavelength of the plurality of subwavelengths is in a single channel window (col. 8, line 22 to col. 9, line 19); and combining the plurality of subwavelengths (fig. 4, optical multiplexer element). Swanson does not explicitly disclose the channel window as an ITU window. However, it would

have been obvious to one of ordinary skill in the art at the time of the invention that the system of Swanson would conform to the ITU DWDM channel standard, as described above for claim 2.

Regarding claim 40, Swanson discloses the system of claim 33, wherein a total bandwidth occupied by the subwavelengths is within a same channel window of the optical input (col. 9, lines 9-19). Swanson does not explicitly disclose the channel window as an ITU window. However, it would have been obvious to one of ordinary skill in the art at the time of the invention that the system of Swanson would conform to the ITU DWDM channel standard, as described above for claim 2.

Regarding claim 41, Swanson discloses the system of claim 40, wherein the total bandwidth occupied by the subwavelengths fits through filters set for the bandwidth occupied by the optical input (col. 9, lines 9-19). Swanson does not explicitly disclose that the total bandwidth occupied by the subwavelengths is less than the bandwidth occupied by the optical input; however, it would have been obvious to one of ordinary skill in the art at the time of the invention that the total bandwidth occupied by the subwavelengths would be less than the bandwidth occupied by the optical input, to provide the benefit of the combined subwavelengths fitting through existing filters used in the system with some margin.

Regarding claim 42, Swanson discloses the system of claim 40, wherein the total bandwidth occupied by the subwavelengths is about 5 times or less than a bandwidth occupied by the optical input (col. 9, lines 9-19, where four subwavelengths fitting within the original channel bandwidth means the bandwidth occupied by the subwavelengths is less than five times the bandwidth of the channel bandwidth).

11. Claims 10, 11, 43, 44 and 46-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swanson (US Patent No. 6433904) in view of Dodds (US Patent No. 6259836).

Regarding claim 10, Swanson discloses the method of claim 1, but does not disclose that a single optical transmitter is provided and uses subcarrier multiplexed modulation to produce the plurality of subwavelengths. Dodds discloses generating closely spaced wavelength WDM transmission by generating subwavelengths from single sideband modulation, and modulating the subwavelengths with data (col. 1, lines 10-14 and lines 31-35, col. 3, line 35 to col. 4, line 3, and col. 4, line 62 to col. 5, line 19). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the single sideband modulation and data modulation teaching of Dodds to create modulated WDM wavelengths for the subwavelengths corresponding to an original channel wavelength of the system of Swanson, in order to provide the benefit of not requiring a separate laser for each subwavelength and to provide the advantage of exactly spaced subwavelengths, as taught by Dodds.

Regarding claim 11, Swanson discloses the method of claim 1, but does not disclose that a single optical transmitter is provided and uses optical single side band modulation to produce the plurality of subwavelengths. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Dodds with Swanson as described above for claim 10.

Regarding claim 43, Swanson discloses a long haul optical communication system, comprising: a first optical-to-electronic converter and a first electronic demultiplexer (fig. 4 and col. 8, line 22 to col. 9, line 19); optical transmitters coupled to the first electronic demultiplexer, the optical transmitters being configured to use the demultiplexed electronic signals (fig. 4, transmit-side elements lambda.sub.2) and

splitting an optical input with a first data rate into a plurality of subwavelengths, wherein subwavelengths of the plurality of subwavelengths each have a spectral efficiency close to or greater than a spectral efficiency of the optical input (col. 8, line 22 to col. 9, line 19); an optical demultiplexer or optical splitter (fig. 4, receive-side optical demultiplexer); an electronic multiplexer (fig. 4, element MUX); and a plurality of receivers positioned to receive input from the optical demultiplexer or the optical splitter and produce an output that is coupled to the electronic multiplexer (fig. 4, receive-side elements lambda.sub.2). Swanson does not disclose that the optical transmitter has a common optical carrier, or that it is configured to modulate the common optical carrier by using the demultiplexed electronic signals. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Dodds with Swanson as described above for claim 10.

Regarding claim 44, the combination of Swanson and Dodds discloses the system of claim 43, wherein the first data rate is 10 Gb/sec or more (col. 10, lines 12-23).

Regarding claim 46, the combination of Swanson and Dodds discloses the system of claim 43, wherein the plurality of receivers is not wavelength-tunable (fig. 4, “new” spectrum and receive-side elements lambda.sub.2).

Regarding claim 47, the combination of Swanson and Dodds discloses the system of claim 43, wherein a number of subwavelengths equals a number of receivers (fig. 4 and col. 8, lines 48-65 and col. 9, lines 9-19).

Regarding claim 48, the combination of Swanson and Dodds discloses the system of claim 43, wherein a number of subwavelengths equals a number demultiplexed electronic signals (col. 9, lines 9-19).

Regarding claim 49, the combination of Swanson and Dodds discloses the system of claim 43, wherein a total bandwidth occupied by the subwavelengths is within a same window of the optical input (col. 8, lines 51-54 and col. 9, lines 9-15). The combination does not explicitly disclose the channel window as an ITU window. However, it would have been obvious to one of ordinary skill in the art at the time of the invention that the system of Swanson would conform to the ITU DWDM channel standard, as described above for claim 2.

Regarding claim 50, the combination of Swanson and Dodds discloses the system of claim 49, wherein the total bandwidth occupied by the subwavelengths fits through filters set for the bandwidth occupied by the optical input (col. 9, lines 9-19). Swanson does not explicitly disclose that the total bandwidth occupied by the subwavelengths is less than the bandwidth occupied by the optical input; however, it would have been obvious to one of ordinary skill in the art at the time of the invention that the total bandwidth occupied by the subwavelengths would be less than the bandwidth occupied by the optical input, to provide the benefit of the combined subwavelengths fitting through existing filters used in the system with some margin.

Regarding claim 51, the combination of Swanson and Dodds discloses the system of claim 49, wherein the total bandwidth occupied by the subwavelengths is about 5 times or less than a bandwidth occupied by the optical input (col. 9, lines 9-19, where four subwavelengths fitting within the original channel bandwidth means the bandwidth occupied by the subwavelengths is less than five times the bandwidth of the channel bandwidth).

Conclusion

12. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

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